Toxins Mid-Unit Review
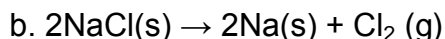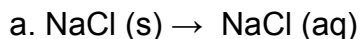
Lethal Dose
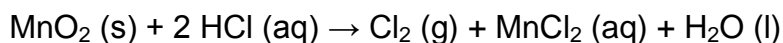
1. a. What is more toxic acetaminophen (LD_{50} = 2,404 mg/kg) or methadone (LD_{50} = 95 mg/kg)?

    b. How much acetaminophen will be lethal to a 205 pound man (2.2 lbs=1kg)?

Chemical Equations

2. Label each reaction as a physical or chemical reaction. What are the differences?
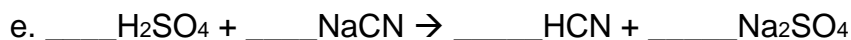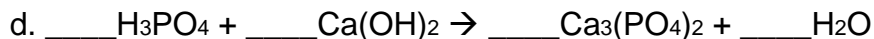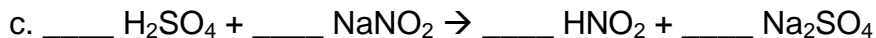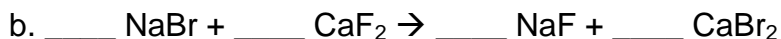
    a. $NaCl$ (s) → $NaCl$ (aq)

    b. $2NaCl$(s) → $2Na$(s) + Cl_2 (g)

3. Translate the following equation using words.

    $$MnO_2 \text{ (s)} + 2\ HCl \text{ (aq)} → Cl_2 \text{ (g)} + MnCl_2 \text{ (aq)} + H_2O \text{ (l)}$$
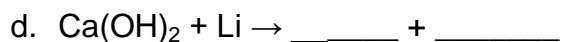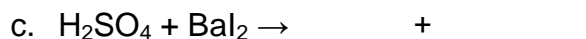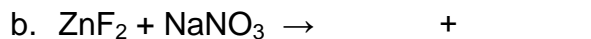
4. Translate the following words into a balanced chemical equation.

    Strontium bromide reacts with rubidium oxide to form strontium oxide and rubidium bromide.

5. **Name** the type of chemical reaction **and balance** the equation.

    a. _____ S_8 + _____O_2 → _____ SO_3

    b. _____ $NaBr$ + _____ CaF_2 → _____ NaF + _____ $CaBr_2$

    c. _____ H_2SO_4 + _____ $NaNO_2$ → _____ HNO_2 + _____ Na_2SO_4

    d. _____H_3PO_4 + _____$Ca(OH)_2$ → _____$Ca_3(PO_4)_2$ + _____H_2O

    e. _____H_2SO_4 + _____$NaCN$ → _____HCN + _____Na_2SO_4

6. Complete the following reactions and then balance them.

    a. Sr + HCl → _____ + _____

    b. ZnF_2 + $NaNO_3$ → _____ + _____

    c. H_2SO_4 + BaI_2 → _____ + _____

    d. $Ca(OH)_2$ + Li → _____ + _____
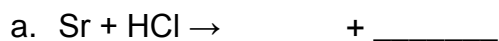
Moles

7. Answer the following questions about a mole.

    a. How many atoms are in 1 mole of Cu, copper?

    b. How many molecules are in 0.5 mole of H_2O, water?

    c. How many atoms are in 2 moles of Zn, zinc?

8. What is the molar mass of $Al_2(SO_4)_3$?

9. Answer the following questions about the relationship between mole and mass.

    a. How many moles are in 2.5 grams of H_2O, water?

    b. How many grams are 0.75 moles of H_2O, water?

10. Answer the following questions about the relationship between moles, mass, and atoms.

    a. How many atoms are in 25.0 grams of NaCl, sodium chloride?

    b. How many grams are in 1.50×10^{22} atoms of Au, gold?

Stoichiometry
Use the following combustion reaction with propane, C_3H_8, to answer the following questions.

$$C_3H_8 + 5O_2 \rightarrow 3 CO_2 + 4H_2O$$
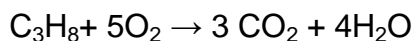
11. How many moles of O_2, oxygen, will produce 2.5 moles of H_2O, water?

12. How many grams of O_2, oxygen, will be needed to react 1.50 moles of C_3H_8, propane?

13. How many moles of H_2O, water, will be produced if there is 25.0 grams of CO_2, carbon dioxide gas?

14. How many grams of C_3H_8, propane, are needed to produce 175 grams of CO_2, carbon dioxide gas?

15. Zn + HCl → ZnCl$_2$ + H$_2$
    How many moles of hydrogen are produced from the reaction of 3.0 moles of zinc?

16. Acetylene gas, C_2H_2, used in welding, produces an extremely hot flame when it burns in pure oxygen according to the following reaction.
    C_2H_2 (g) + O_2 (g) → CO_2 (g) + H_2O (g)
    How many moles of water are produced when 25.0 grams of C_2H_2 burns completely?

17. Mg + Fe$_2$O$_3$ → Fe + MgO
    How many moles of iron are produced with 25.0 grams of magnesium?

18. If 30.0 g of H_2SO_4 reacts with aluminum hydroxide in a double replacement reaction, what mass of water is produced?